FIGURE 1

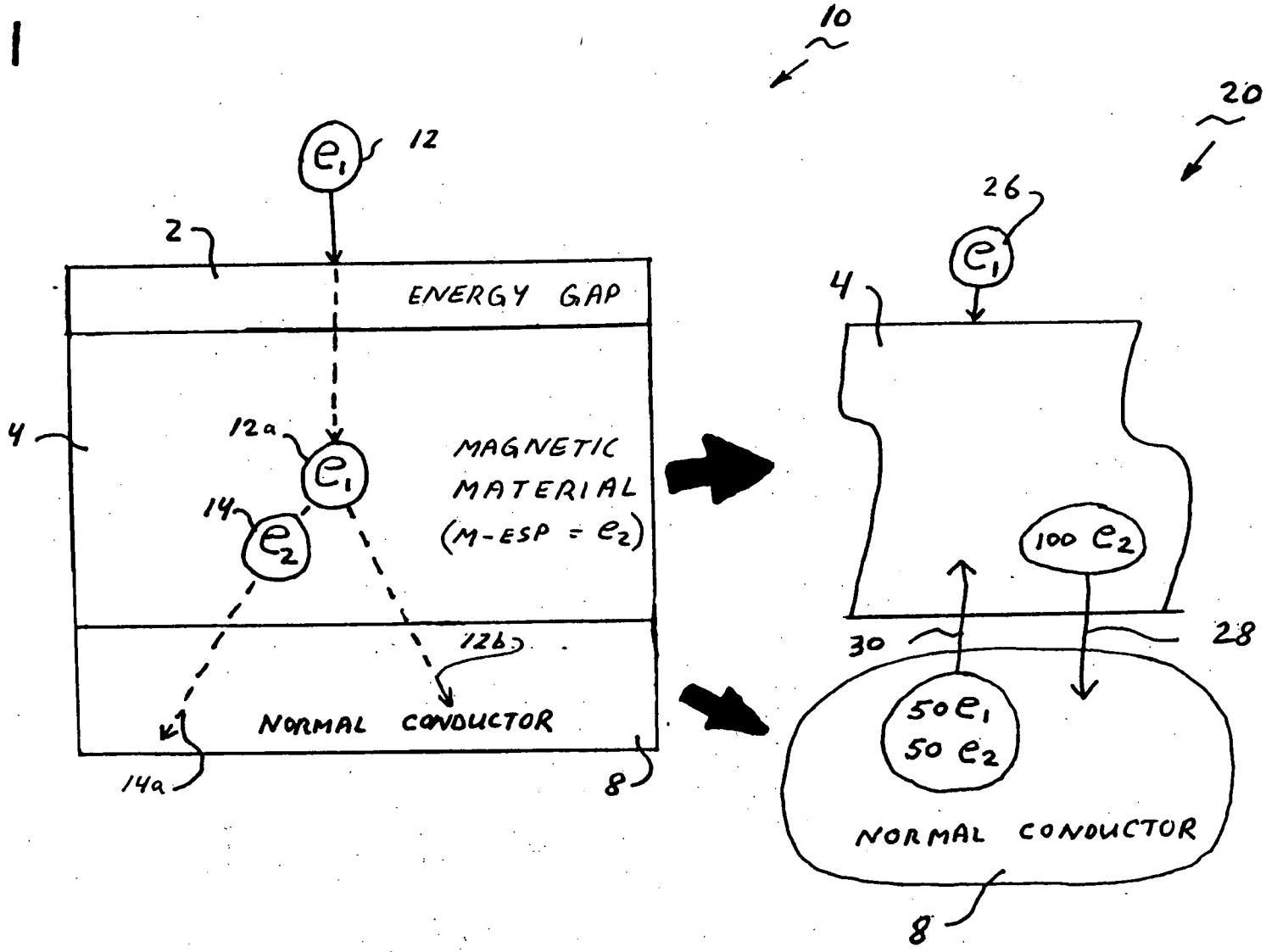

10
20
e_1
12
2
ENERGY GAP
4
12a
e_1
MAGNETIC MATERIAL
(M-ESP = e_2)
14
e_2
12b
NORMAL CONDUCTOR
14a
8
26
e_1
4
100 e_2
30
28
50 e_1
50 e_2
NORMAL CONDUCTOR
8

FIGURE 1B

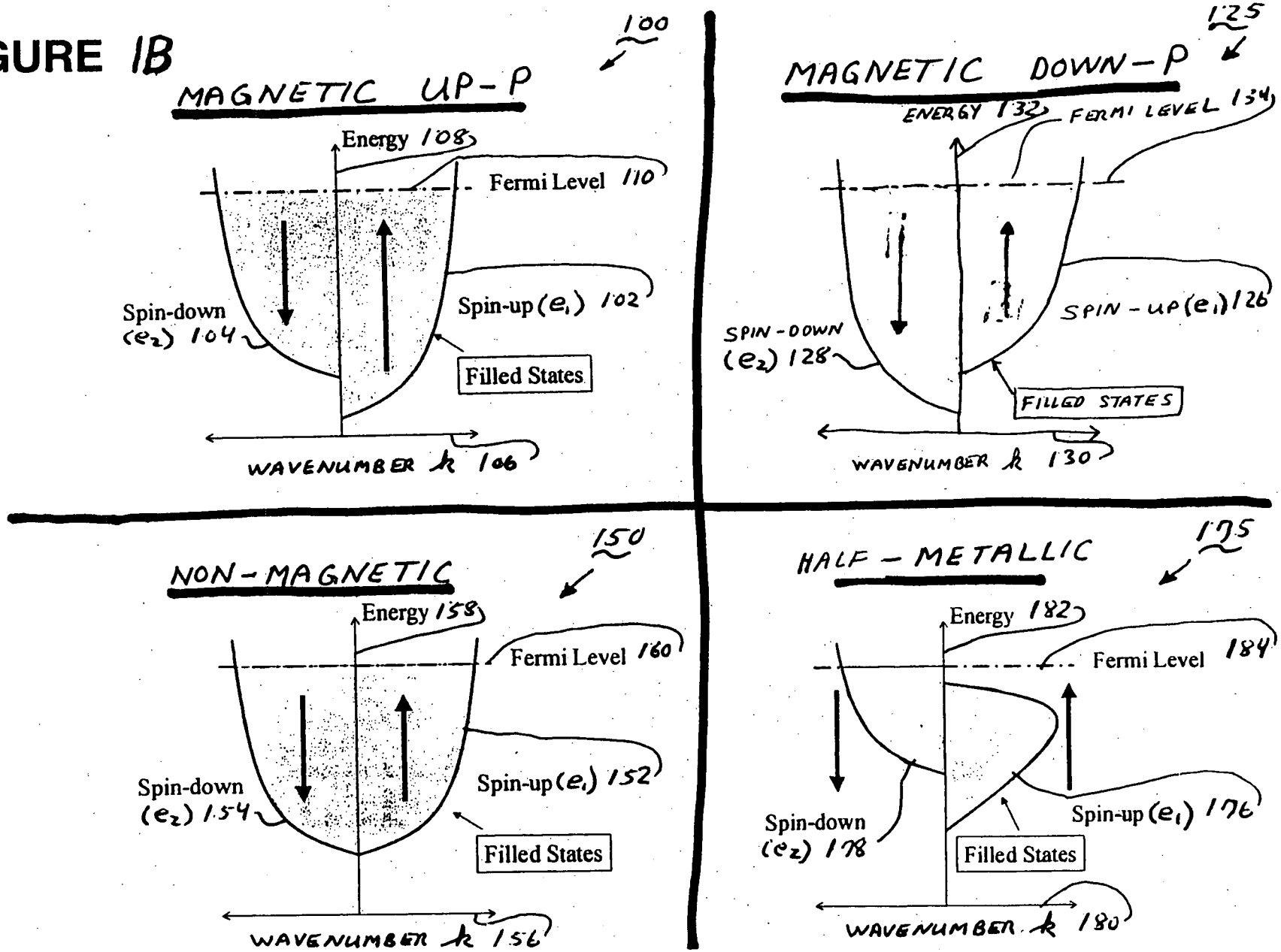

100
MAGNETIC UP-P
Energy 108
Fermi Level 110
Spin-down (e_2) 104
Spin-up (e_1) 102
Filled States
WAVENUMBER k 106
125
MAGNETIC DOWN-P
ENERGY 132
FERMI LEVEL 134
SPIN-DOWN (e_2) 128
SPIN-UP (e_1) 126
FILLED STATES
WAVENUMBER k 130
150
NON-MAGNETIC
Energy 158
Fermi Level 160
Spin-down (e_2) 154
Spin-up (e_1) 152
Filled States
WAVENUMBER k 156
175
HALF-METALLIC
Energy 182
Fermi Level 184
Spin-down (e_2) 178
Spin-up (e_1) 176
Filled States
WAVENUMBER k 180

FIGURE 2

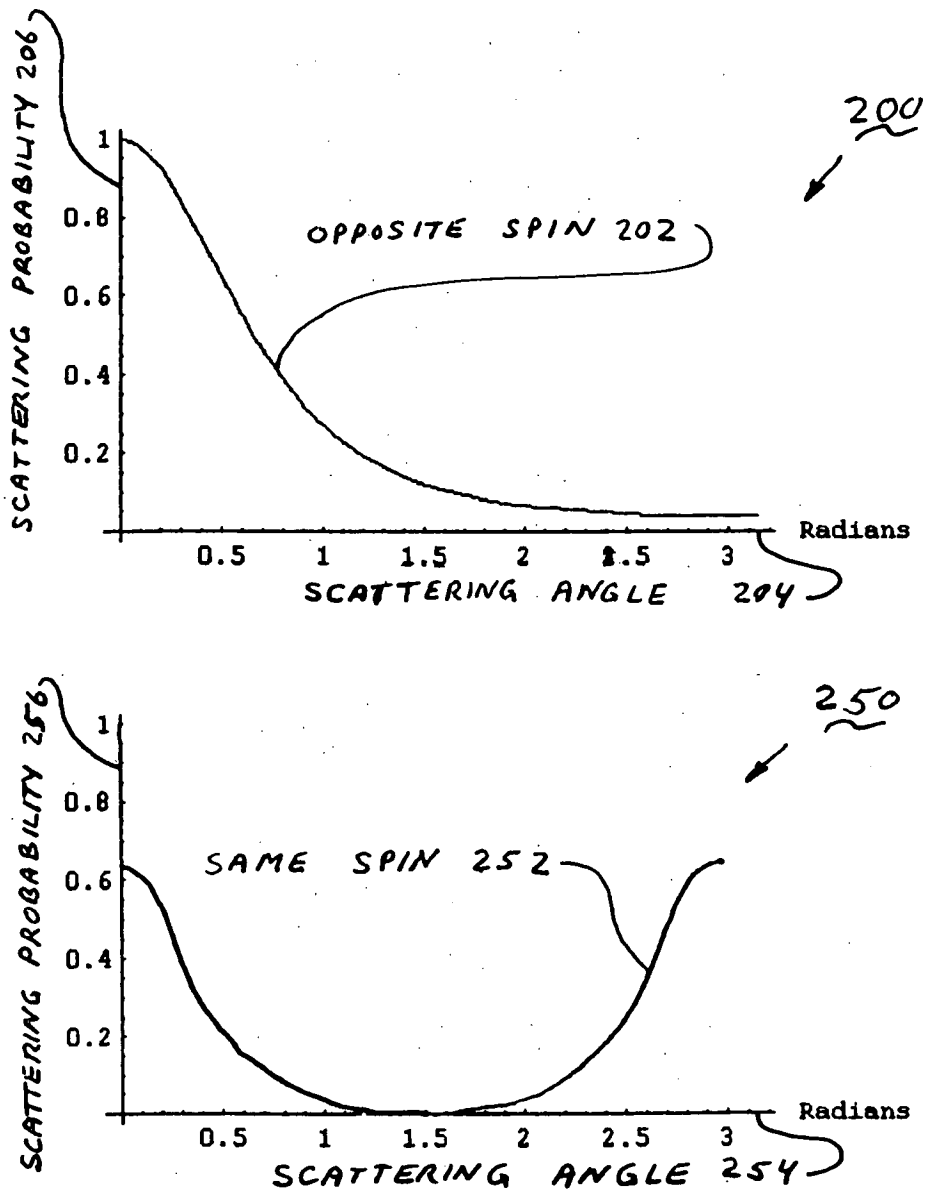

200
SCATTERING PROBABILITY 206
1
0.8
0.6
0.4
0.2
OPPOSITE SPIN 202
0.5
1
1.5
2
2.5
3
Radians
SCATTERING ANGLE 204
250
SCATTERING PROBABILITY 256
1
0.8
0.6
0.4
0.2
SAME SPIN 252
0.5
1
1.5
2
2.5
3
Radians
SCATTERING ANGLE 254

FIGURE 3

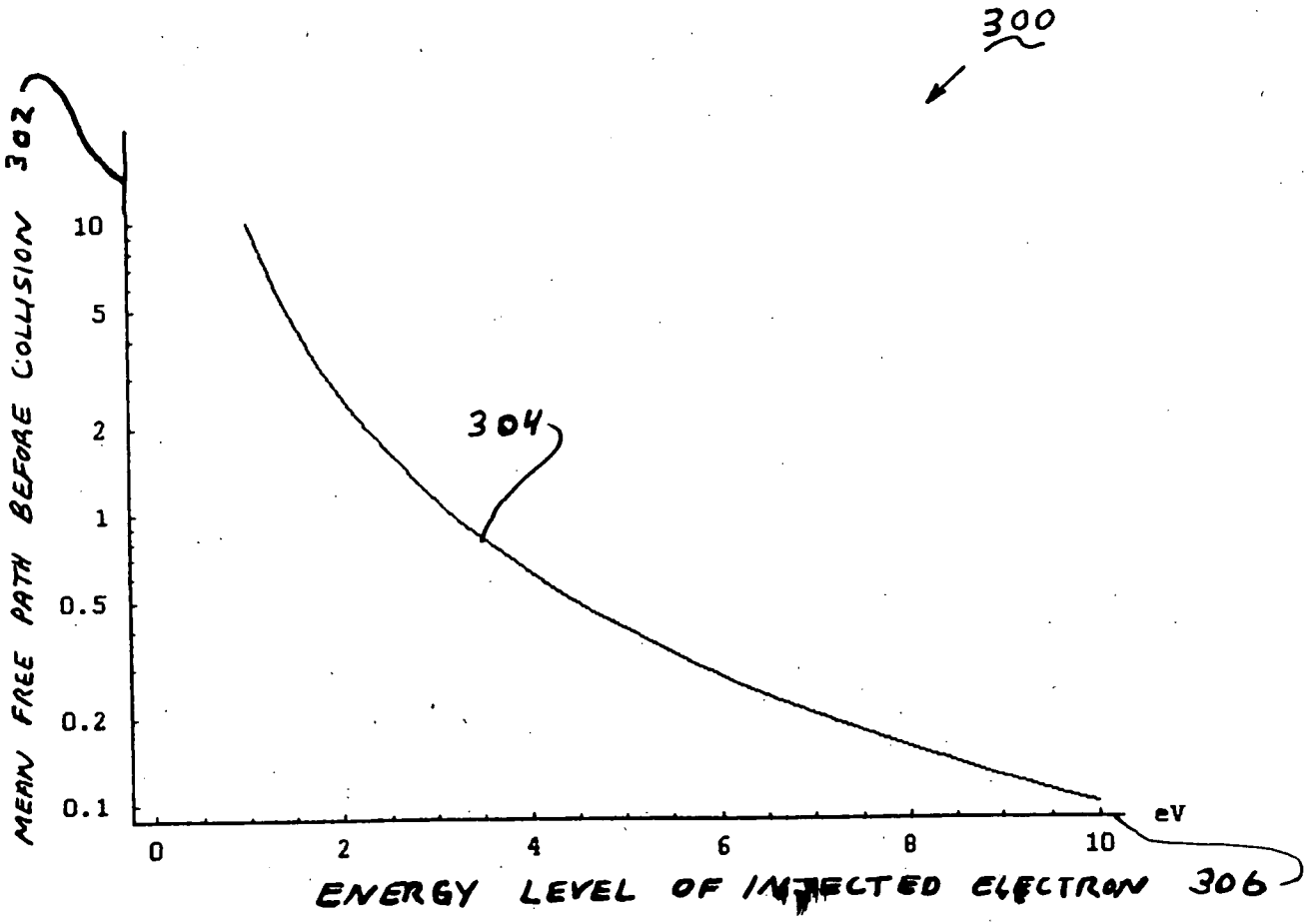

300
MEAN FREE PATH BEFORE COLLISION 302
10
5
2
1
0.5
0.2
0.1
304
0
2
4
6
8
10
eV
ENERGY LEVEL OF INJECTED ELECTRON 306

FIGURE 4

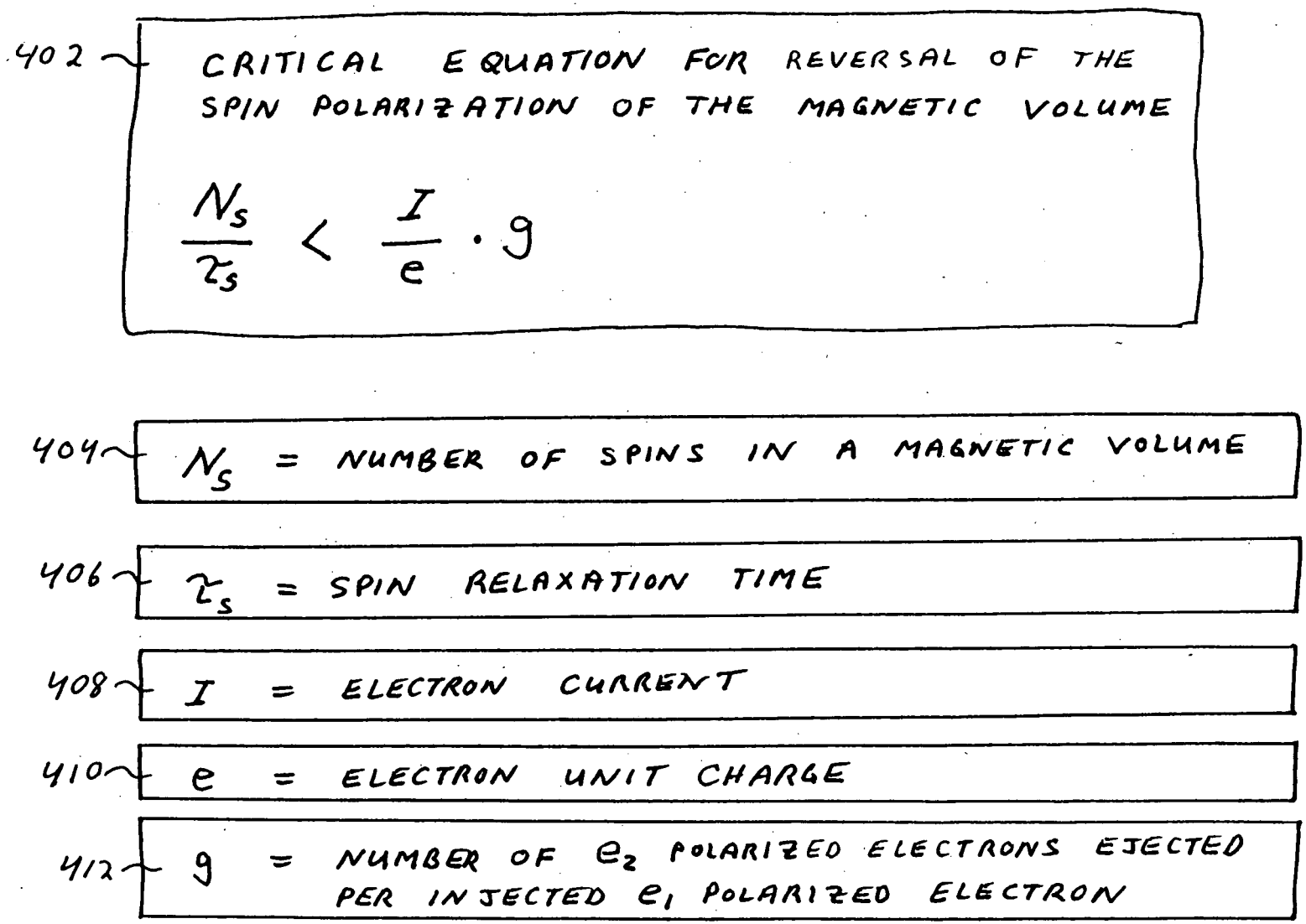

402
CRITICAL EQUATION FOR REVERSAL OF THE SPIN POLARIZATION OF THE MAGNETIC VOLUME
$\frac{N_s}{\tau_s} < \frac{I}{e} \cdot g$
404
N_s = NUMBER OF SPINS IN A MAGNETIC VOLUME
406
τ_s = SPIN RELAXATION TIME
408
I = ELECTRON CURRENT
410
e = ELECTRON UNIT CHARGE
412
g = NUMBER OF e_2 POLARIZED ELECTRONS EJECTED PER INJECTED e_1 POLARIZED ELECTRON

FIGURE 5.

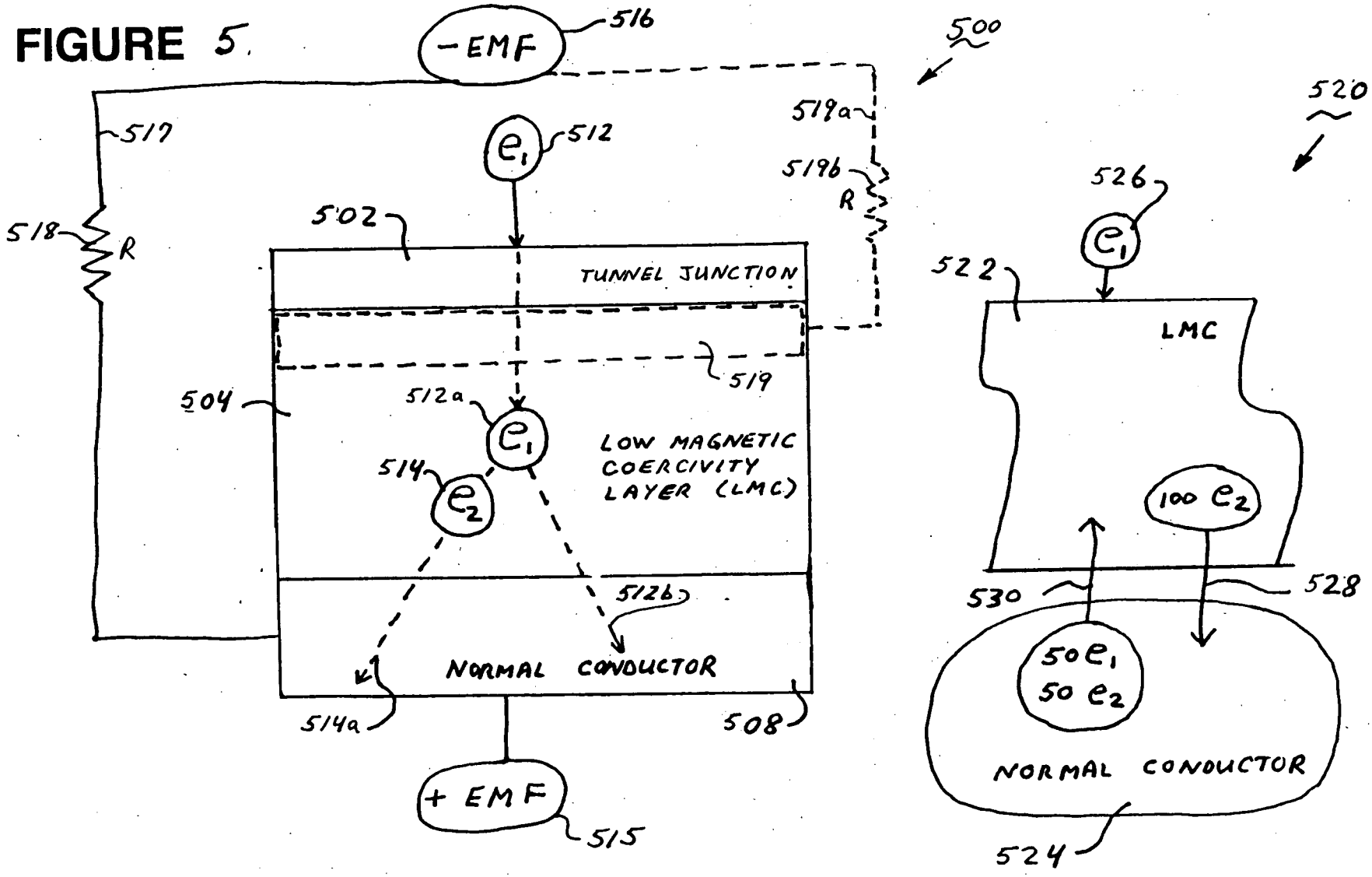
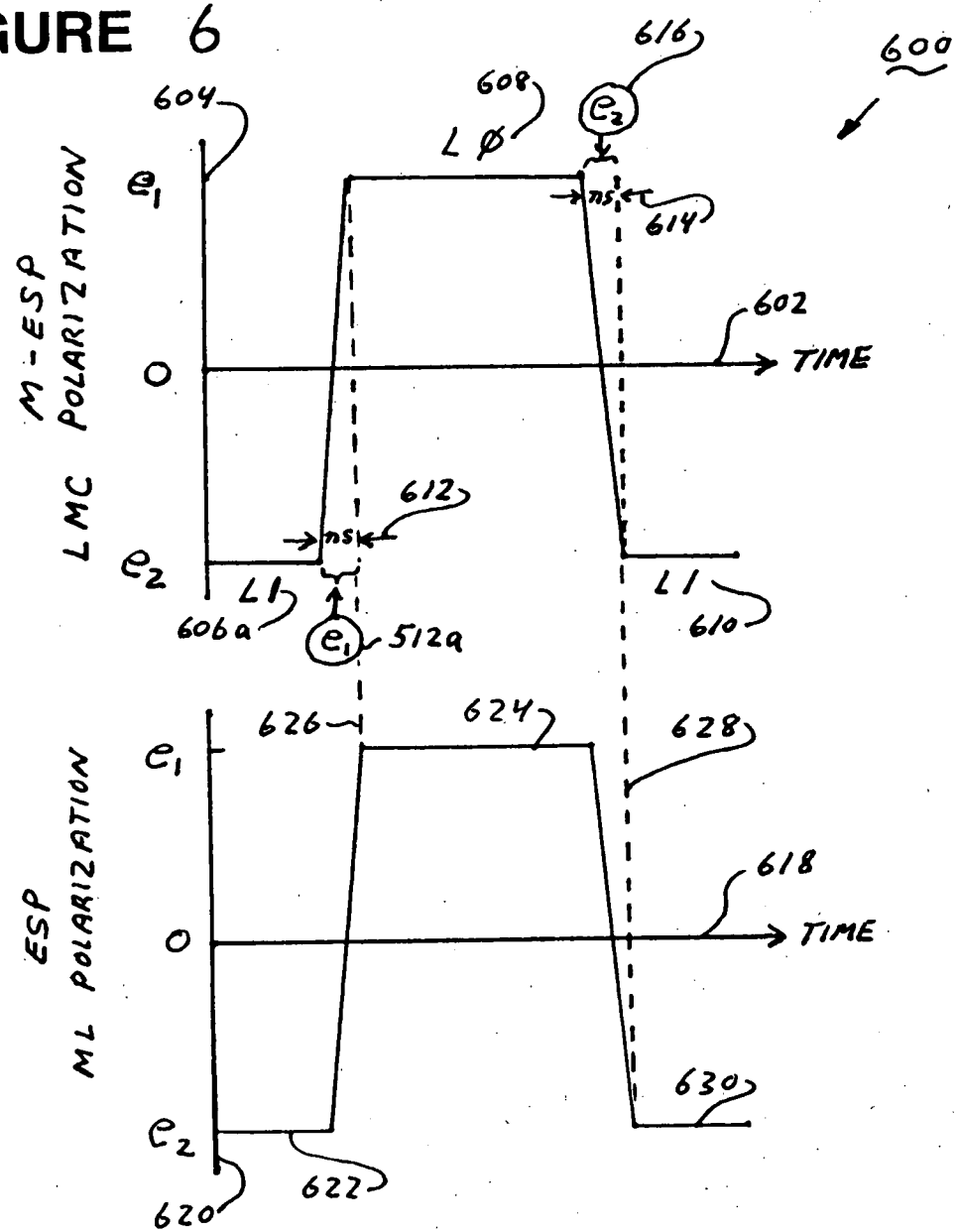

-EMF
516
500
519a
519
512
519b
R
518
R
502
TUNNEL JUNCTION
519
504
512a
LOW MAGNETIC COERCIVITY LAYER (LMC)
514
512b
NORMAL CONDUCTOR
514a
508
+ EMF
515
520
526
522
LMC
100
530
528
50
50
NORMAL CONDUCTOR
524

FIGURE 6


600
604
608
616
e_2
L Ø
e_1
ns_1
614
602
M-ESP POLARIZATION LMC
0
TIME
612
ns
e_2
L1
606a
e_1
512a
L1
610
626
624
628
ESP ML POLARIZATION
e_1
618
0
TIME
630
e_2
620
622

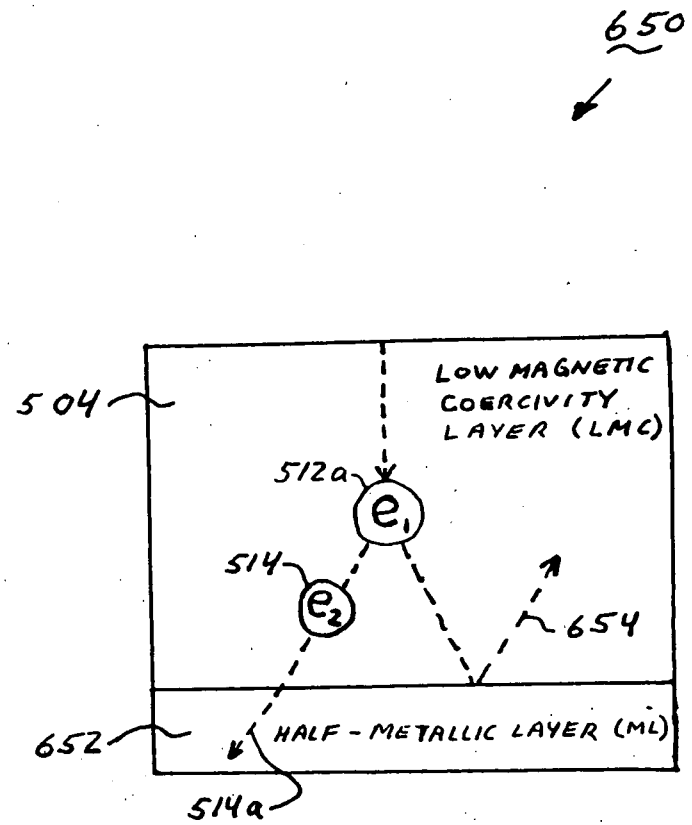
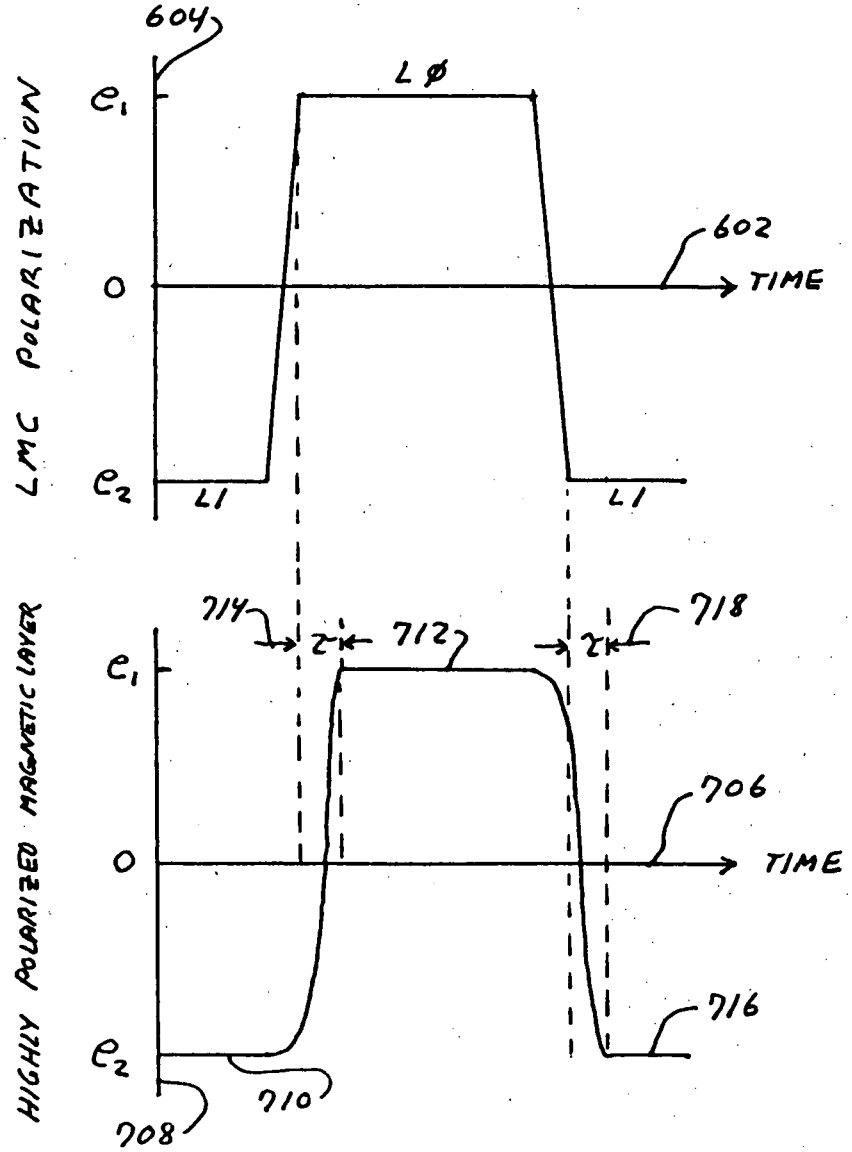

650
504
LOW MAGNETIC COERCIVITY LAYER (LMC)
512a
e_1
514
e_2
654
652
HALF-METALLIC LAYER (ML)
514a

FIGURE 7


604
LMC POLARIZATION
e_1
$L\phi$
602
0
TIME
e_2
L_1
L_1
714
τ
712
τ
718
HIGHLY POLARIZED MAGNETIC LAYER
e_1
706
0
TIME
e_2
716
710
708

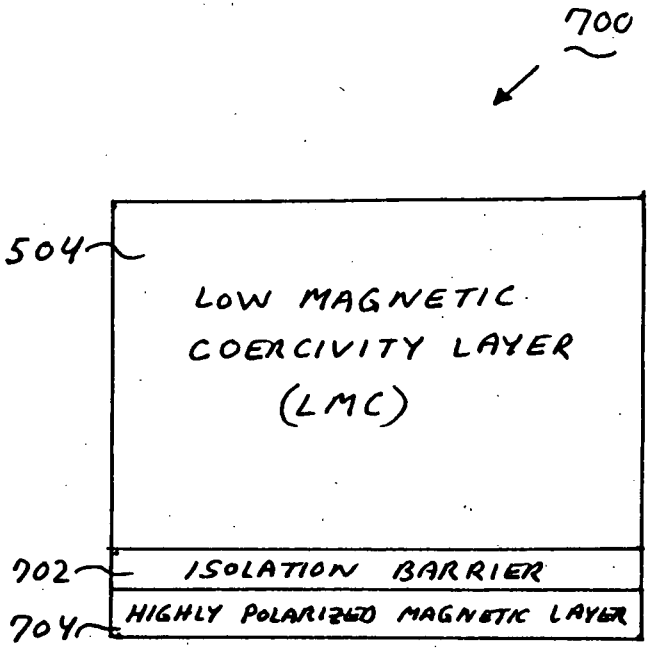

700
504
LOW MAGNETIC COERCIVITY LAYER (LMC)
702
ISOLATION BARRIER
704
HIGHLY POLARIZED MAGNETIC LAYER

FIGURE 8

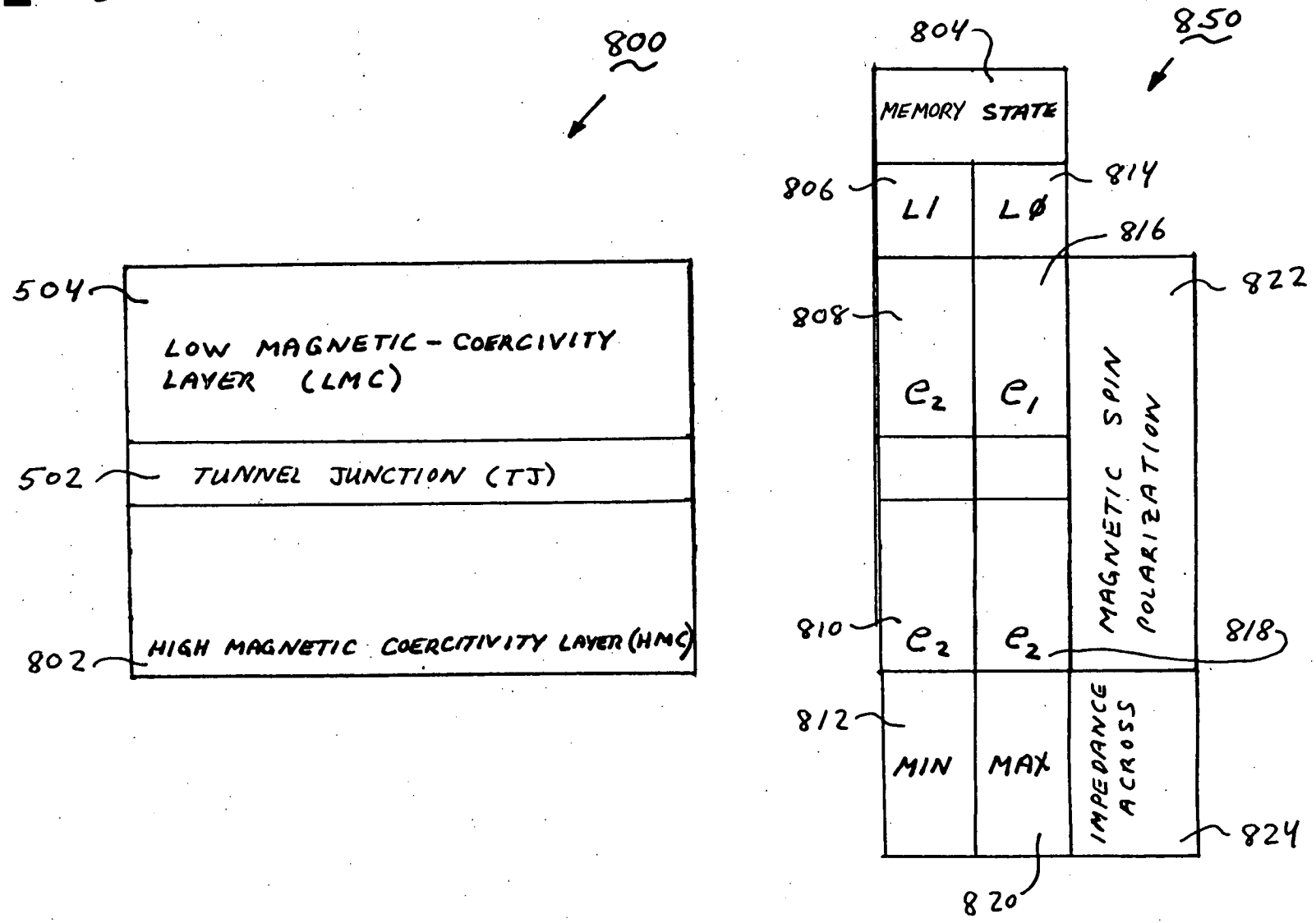

800
504
LOW MAGNETIC - COERCIVITY LAYER (LMC)
502
TUNNEL JUNCTION (TJ)
802
HIGH MAGNETIC COERCITIVITY LAYER (HMC)
850
804
MEMORY STATE
806
L1
LØ
814
816
822
808
C2
C1
MAGNETIC SPIN POLARIZATION
810
C2
C2
818
812
MIN
MAX
IMPEDANCE ACROSS
824
820

FIGURE 8B

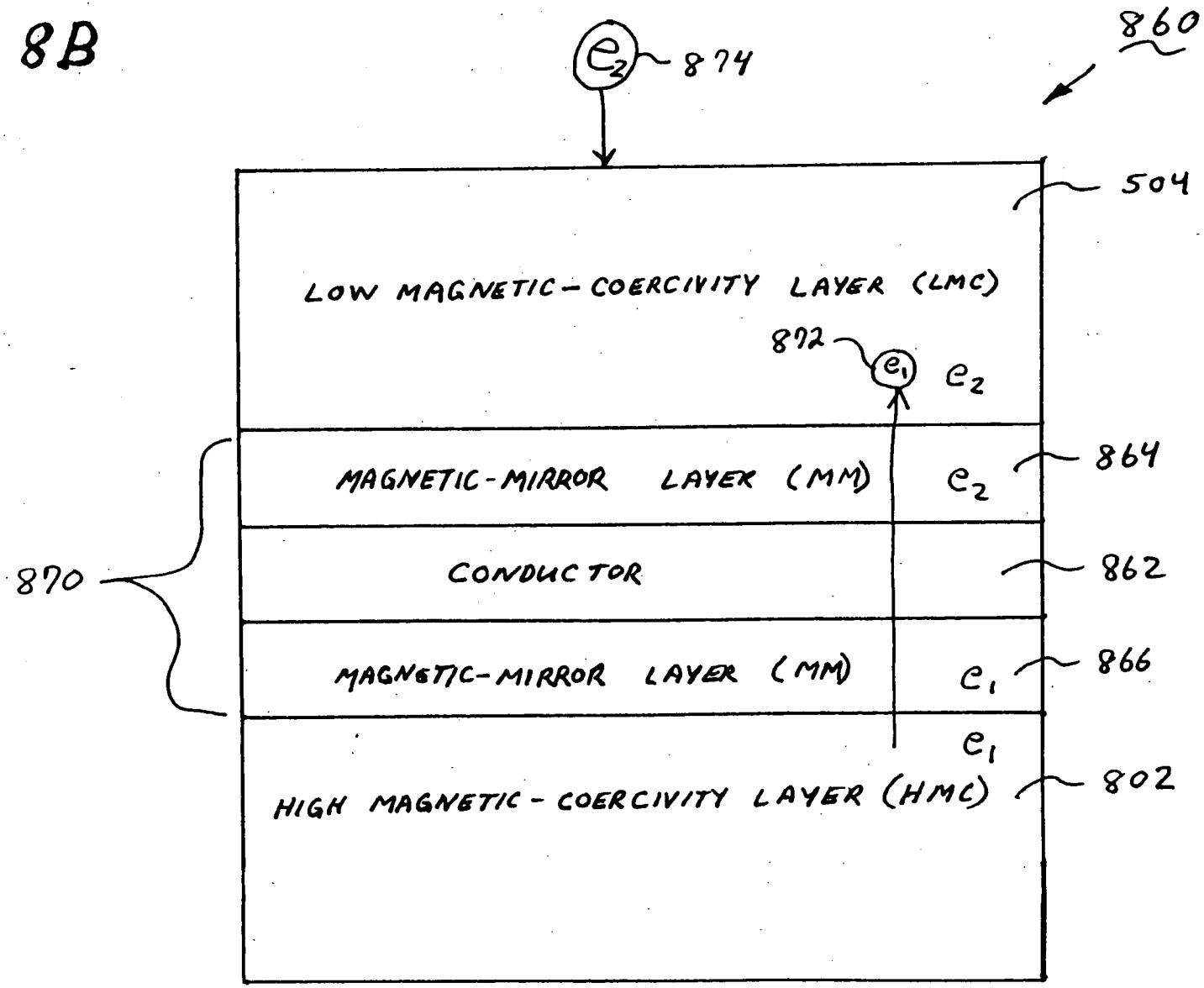

860
e_2
874
504
LOW MAGNETIC-COERCIVITY LAYER (LMC)
872
e_1
e_2
MAGNETIC-MIRROR LAYER (MM)
e_2
864
870
CONDUCTOR
862
MAGNETIC-MIRROR LAYER (MM)
e_1
866
e_1
HIGH MAGNETIC-COERCIVITY LAYER (HMC)
802

FIGURE 9

Application to VMRAM

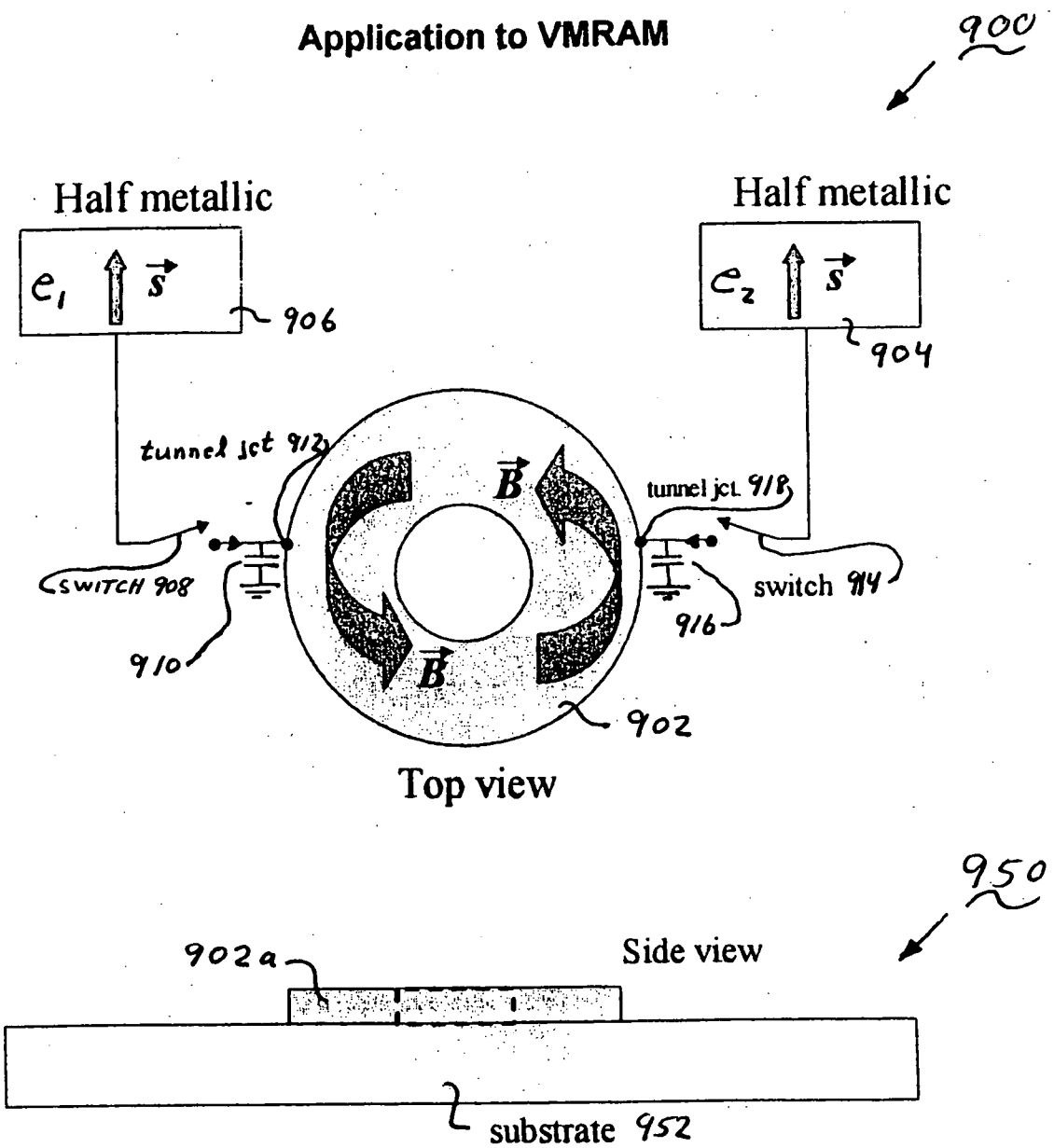
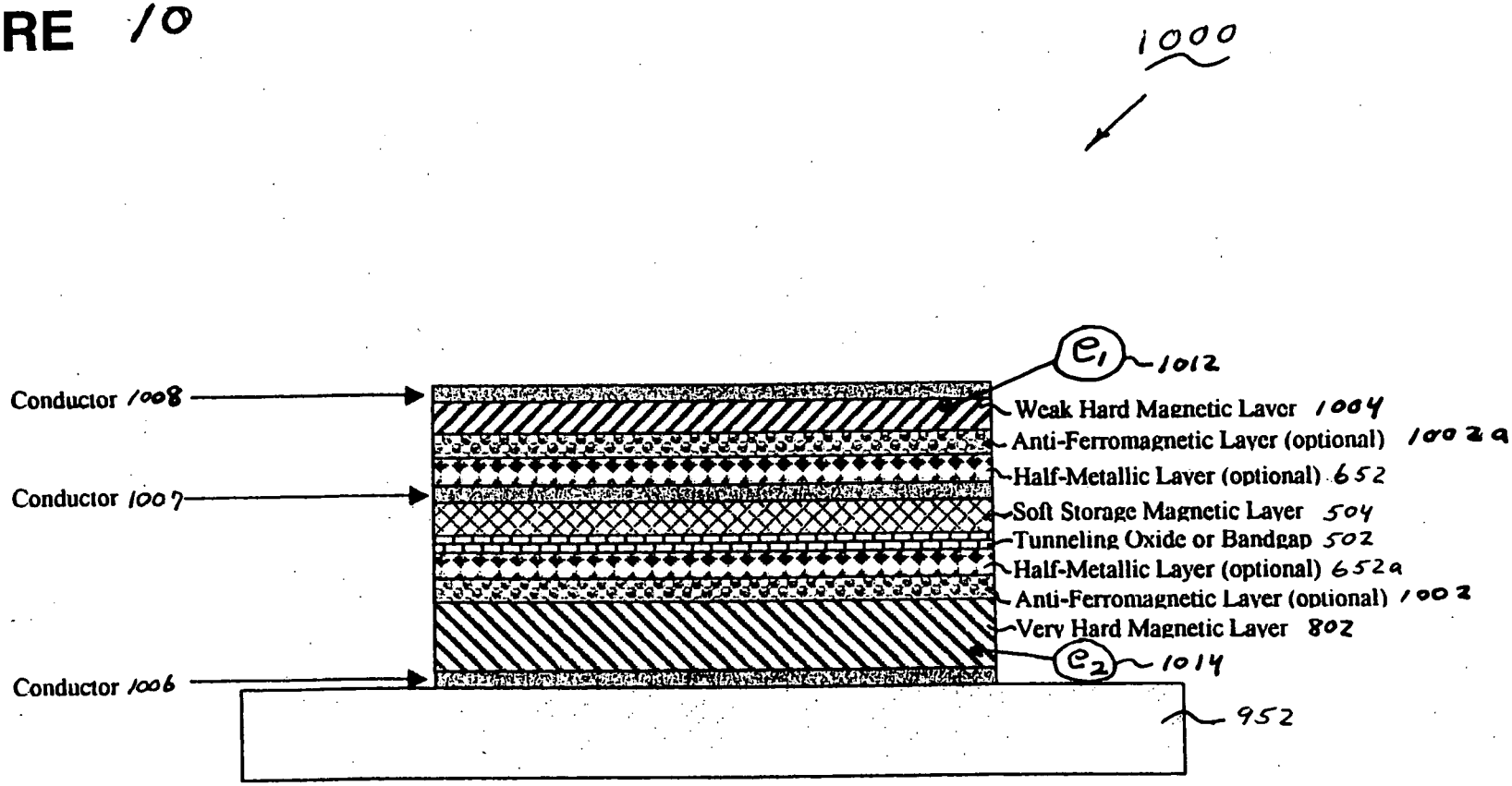


FIGURE 10


1000
e1
1012
Conductor 1008
Weak Hard Magnetic Layer 1004
Anti-Ferromagnetic Layer (optional) 1002a
Half-Metallic Layer (optional) 652
Conductor 1007
Soft Storage Magnetic Layer 504
Tunneling Oxide or Bandgap 502
Half-Metallic Layer (optional) 652a
Anti-Ferromagnetic Layer (optional) 1002
Very Hard Magnetic Layer 802
e2
1014
Conductor 1006
952